WHAT IS CLAIMED IS:

1. A clamp to superpose and hold together at least two flexible polymeric films while they are optically sealed or cut by a at least a laser beam, the clamp comprising:

two jaws wherein at least one of said jaws can be moved to allow a closing and an opening of the clamp,

one of said jaws, being a contact jaw, to bring the films into contact,

the other jaw, being an optical jaw, having an optical window to let said at least one laser beam pass through it and wherein said window is wide enough to allow to optically seal or cut the whole width of said films if required, and

support means to interconnect said jaws and to allow a controlled opening and closing of the clamp.

2. The clamp as claimed in claim 1, wherein said optical window comprises an aperture in a structure.

3. The clamp as claimed in claim 1, wherein said optical window is made of a material transparent to the laser beam.

4. The clamp as claimed in claim 1, wherein said contact jaw has a profile to compress said films together either by applying pressure or tension on the films at the point of sealing and cutting.

5. The clamp as claimed in claim 1, wherein said support means comprises an interconnection on at least one end of said jaws that leaves a free space between the jaws to let the films pass through.

6. The clamp as claimed in claim 5, wherein said support means provides for said opening to be large enough to allow for a pouch with its content to pass through.

7. The clamp as claimed in claim 1, wherein at least one of said jaws can be heated.

8. The clamp as claimed in claim 1, wherein said contact jaw has a surface that reflects partly or totally the laser beam intensity that has not been absorbed by the films and wherein said surface is profiled to reflect back toward the films the unabsorbed laser beam intensity.

9. The clamp as claimed in claim 8, wherein said optical jaw has a surface that reflects partly or totally the laser beam intensity that has not been absorbed by the films and wherein said surface is profiled to reflect back toward the films the unabsorbed laser beam intensity.

10. The clamp as claimed in claim 9, wherein the surface of the jaws that are exposed to the unabsorbed laser intensity by the films are profiled to allow for a plurality of back an forth reflections from one jaw to the other, allowing therefore for a multi-pass of laser beam into the films.

11. The clamp as claimed in claim 9, wherein the surface of the jaws that are exposed to the unabsorbed laser intensity by the films are profiled to allow for three back and forth reflections from one jaw to the other, allowing therefore for four passes of laser beam into the films.

12. A method of sealing or cutting optically with at least one laser beam flexible polymeric films, the method comprising:

superposing and bringing into contact at least two of said films together,

exposing an area of the films, the area corresponding to a sealing volume, to the at least one laser beam, providing an incident laser intensity, for the purpose of sealing or cutting said films,

increasing an intensity of the laser beam in the sealing volume by re-injecting partly or totally an unabsorbed portion of the incident laser beam intensity that has not been absorbed by the films back to the films by using at least one reflective device, therefore improving the efficiency of the sealing or cutting method by having more light intensity of said incident laser intensity absorbed by the films.

13. The method as claimed in claim 12, wherein said sealing or cutting optically is a repetitive process step that is performed within a predetermined time duration only with the benefit of said re-injecting said unabsorbed laser intensity back to the films.

14. The method as claimed in claim 12, wherein said unabsorbed laser intensity is at least 80 % of said incident laser intensity.

15. The method as claimed in claim 12, wherein said unabsorbed laser intensity is at least 85 % of said incident laser intensity.

16. The method as claimed in claim 12, wherein said unabsorbed laser intensity is at least 90 % of said incident laser intensity.

17. The method as claimed in claim 12, wherein said exposing an area of the films comprises:

focusing on the films the laser beam into a small spot,

scanning the small spot along the whole width of the films to obtain an elongated seal, and

controlling the scanning to obtain a high quality seal.

18. The method as claimed in claim 17, wherein said scanning is continuous.

19. The method as claimed in claim 17, wherein said scanning is performed by using an optical set-up that comprises at least one mirror to scan the laser beam spot on the films.

20. The method as claimed in claim 12, wherein exposing films comprises shaping the laser beam into a line wherein said line is wide enough to cover the whole width of the films to be sealed.

21. The method as claimed in claim 12, wherein:

said superposing and bringing into contact the films comprises actuating a mounting interconnecting two jaws of a clamp to allow a controlled opening and closing of the clamp to press said films between said jaws and release said films after sealing or cutting,

said exposing of the films comprises directing said incident laser beam through a window in one of said jaws, and

said re-injecting of unabsorbed laser intensity back to the films comprises reflecting said unabsorbed laser intensity off a reflective surface on another of said jaws.

22. The method as claimed in claim 21, wherein said reflective surface is profiled to reflect back toward the films the unabsorbed laser intensity in said volume with an intensity distribution essentially the same as the incident laser intensity.

23. The method as claimed in claim 22, wherein the surface of the jaws that are exposed to the unabsorbed laser intensity by the films are profiled to allow for a plurality of back an forth reflections from one jaw to the other, allowing therefore for a multi-pass of laser beam into the films.

24. The method as claimed in claim 22, wherein the surface of the jaws that are exposed to the unabsorbed laser intensity by the films are profiled to allow for three

back and forth reflections from one jaw to the other, allowing therefore for four passes of laser beam into the films.

25. The method as claimed in claim 21 further comprising monitoring said sealing or cutting by inspecting, using an optical detection assembly, said area of the films through the optical window of the clamp, while the sealing or cutting is being performed.

26. A method of optically sealing and cutting flexible polymeric films with at least one laser beam having a shaped intensity profile, the method comprising:

shaping the at least one laser beam intensity profile by using an optical device to provide the desired intensity profile,

superposing and bringing into contact at least two of said films together, and

exposing an area of the films using appropriate optical elements, the area being referred to as a seal-cut-seal volume, to said desired intensity profile for the purpose of obtaining in one exposure step two sealed regions where the films are sealed together separated by a cut region where the films have been cut and wherein by the time the cut region is performed, the sealed regions are sealed.

27. The method as claimed in claim 26, wherein the laser beam intensity profile is a Gaussian profile.

28. The method as claimed in claim 26, wherein each of said sealed regions are being larger than said cutting region.

29. The method as claimed in claim 26, wherein said beam shaping comprises the use of a lenses and optical filters assembly.

30. The method as claimed in claim 26, wherein said laser beam intensity profile comprises an intensity profile having a dimension at least larger than the width of said films for the purpose of covering the whole width of the films to be sealed or cut.

31. The method as claimed in claim 26, wherein said shaping the laser beam intensity profile comprises focusing into a small spot the laser beam for the purpose of scanning said spot along the seal-cut-seal volume of the films.

32. The method as claimed in claim 26 further comprising monitoring said sealing and cutting by inspecting said sealed regions using an optical detection assembly.

33. The method as claimed in claim 32, wherein said optical detection assembly shares some of said optical elements.

34. A method of forming, sealing and cutting optically, and filling a pouch with a liquid at high speed, said method comprising the steps of:

i) providing a vertical tube, made of polymeric film, that is partially or totally filled with a liquid, or that is being filled with a liquid;

ii) flattening a filled section of said tube for a determined time interval using an optical sealing clamp for subsequent optical sealing and cutting of said section of said tube;

iii) exposing said section of said tube to at least one laser beam intensity, for a time exposure interval τ, to heat in a controlled manner said section of said tube, said intensity being shaped to obtain a desired intensity profile and to provide a corresponding absorbed intensity profile in said section of said tube;

iv) providing a desired heat amount to said section of said tube by optimizing a combination of said absorbed intensity profile, said time exposure interval, and by heating if required said optical sealing clamp;

v) obtaining as a result two seals across said section of said tube and simultaneously severing said tube between the seals, to form a top seal for a filled pouch that is separated form said tube and a bottom seal for said vertical tube.

35. The method as claimed in claim 34, wherein said providing a vertical tube comprises the steps of:

providing, in roll form, a polymeric film,

drawing said film by drawings means, over a tube former to form said vertical tube having an overlapped vertical film edge,

sealing said overlapped vertical edge with a vertical sealer to form a vertical seal,

continuously feeding a liquid within said tube below said vertical sealer and above said optical sealing clamp.

36. The method as claimed in claim 34, wherein said optical sealing clamp comprises:

two jaws wherein at least one of said jaws can be moved to allow a closing and an opening of the clamp;

one of said jaws, being a contact jaw, to bring into contact a inner wall of said section of said tube;

the other jaw, being an optical jaw, having an optical window to let said at least one laser beam intensity pass through it, providing the exposing of the section of the tube to the laser beam, and wherein said window is wide enough to allow to optically seal or cut the whole width of said section of said tube; and

support means to interconnect said jaws and to allow a controlled opening and closing of the clamp.

37. The method as claimed in claim 36, wherein said optical window comprises an aperture in a structure.

38. The method as claimed in claim 36, wherein said optical window is made of a material transparent to the laser beam.

39. The method as claimed in claim 36, wherein said contact jaw has a profile to compress said inner wall of said tube together either by applying pressure or tension on said tube at the point of sealing and cutting.

40. The method as claimed in claim 39, wherein said support means comprises an interconnection on at least one end of said jaws that leaves a free space between the jaws to let the tube pass through and wherein said support means provides for said opening to be large enough to allow for said filled pouch to pass through.

41. The method as claimed in claim 36, further comprising re-injecting, partially or totally, said laser beam intensity that has not been absorbed in step iii) by means of a reflective property of said optical sealing clamp, to enhance in a controlled manner heat in the said section of said tube.

42. The method as claimed in claim 41, wherein said contact jaw has a profiled surface that reflects partly or totally the laser beam intensity that has not been absorbed in step iii) back to the tube.

43. The method as claimed in claim 42, wherein said optical jaw has a profiled surface that reflects partly or totally the laser beam intensity that has not been absorbed by the tube back to the tube.

44. The method as claimed in claim 43, wherein the surface of the jaws are profiled to allow for a plurality of back an forth reflections from one jaw to the other, allowing therefore for a multi-pass of the laser beam intensity into the films.

45. The method as claimed in claim 43, wherein the surface of the jaws are profiled to allow for three back and forth reflections from one jaw to the other, allowing therefore for four passes of the laser beam intensity into the films.

46. The method as claimed in claim 34, wherein said exposing comprises:

focusing on said section of said tube the laser beam intensity into a small spot;

scanning the small spot along the whole width of said section of said tube to obtain an elongated seal; and

controlling the scanning to obtain a high quality seal.

47. The method as claimed in claim 46, wherein said scanning is continuous in time.

48. The method as claimed in claim 46, wherein said scanning is performed by using an optical set-up that comprises at least one mirror to scan the laser beam spot on the films.

49. The method as claimed in claim 34, wherein said exposing said section of said tube comprises shaping the laser beam into a line wherein said line is wide enough to cover the whole width of the section of the tube to be sealed.

50. The method as claimed in claim 34, wherein the desired intensity profile is a Gaussian profile.

51. The method as claimed in claim 34, wherein said beam intensity being shaped is performed by using a lenses and optical filters assembly.

52. The method as claimed in claim 34, wherein said desired intensity profile comprises an intensity profile having a dimension at least larger than the width of said tube for the purpose of covering the whole width of the tube to be sealed and cut.

53. The method as claimed in claim 36 further comprising monitoring said sealing and cutting while said seals are being performed by inspecting, using an optical detection assembly, said section of said tube through the optical window of the optical sealing clamp.

54. A method of sealing or sealing-and-cutting packages made with polymeric films using at least one laser source and at least one optical sealing clamp, the method comprising the steps of:

i) providing a partially or completely formed package that is partially or completely filled with its content or being filled with its content;

ii) superposing and bringing into contact an inner wall of a section of said package for subsequent sealing by means of an optical sealing clamp;

iii) exposing said section of said package to at least one laser beam intensity, for a time exposure interval τ, to heat in a controlled manner said section of said package, said intensity being shaped to obtain a desired intensity profile and to provide a corresponding absorbed intensity profile in said section of said package;

iv) providing a desired heat amount to said section of said package in order to perform either a sealing operation or a sealing-and-cutting operation, by optimizing a combination of said absorbed intensity profile, said time exposure interval, and by heating if required said optical sealing clamp;

v) obtaining as a result in the case of the sealing operation, a seal across said section of said package, and in the case of the sealing-and-cutting operation, two seals across said section of said package and simultaneously a cut region between the two seals where the package is cut.

55. The method as claimed in claim 54, wherein step i) comprises:

providing, in roll form, two polymeric film sheets,

drawing one of said film sheets over a packaging station where the content of the package is deposited on the film,

drawing the second film sheet over said content to form said partially formed package.

56. The method as claimed in claim 54, wherein step i) comprises providing a tube made of polymeric film.

57. The method as claimed in claim 54, wherein step i) comprises providing a bag made of a polymeric film.

58. The method as claimed in claim 54, wherein said optical sealing clamp comprises:

two jaws wherein at least one of said jaws can be moved to allow a closing and an opening of the clamp;

one of said jaws, being a contact jaw, to bring into contact said inner wall of said section of said package;

the other jaw, being an optical jaw, having an optical window to let said at least one laser beam intensity pass through it, providing the exposing of the section of the package to the laser beam, and wherein said window is wide enough to allow to optically seal or cut the whole width of said section of said package; and

support means to interconnect said jaws and to allow a controlled opening and closing of the clamp.

59. The method as claimed in claim 58, wherein said optical window comprises an aperture in a structure.

60. The method as claimed in claim 58, wherein said optical window is made of a material transparent to the laser beam.

61. The method as claimed in claim 58, wherein said contact jaw has a profile to compress said inner wall of said package together either by applying pressure or tension on said package at the point of sealing and cutting.

62. The method as claimed in claim 61, wherein said support means comprises an interconnection on at least one end of said jaws that leaves a free space between the

jaws to let the package pass through and wherein said support means provides for said opening to be large enough to allow for said filled package to pass through.

63. The method as claimed in claim 58, further comprising re-injecting, partially or totally, said laser beam intensity that has not been absorbed in step iii) by means of a reflective property of said optical sealing clamp, to enhance in a controlled manner heat in the said section of said package.

64. The method as claimed in claim 63, wherein said contact jaw has a profiled surface that reflects partly or totally the laser beam intensity that has not been absorbed in step iii) back to the package.

65. The method as claimed in claim 64, wherein said optical jaw has a profiled surface that reflects partly or totally the laser beam intensity that has not been absorbed by the package back to the package.

66. The method as claimed in claim 65, wherein the surface of the jaws are profiled to allow for a plurality of back an forth reflections from one jaw to the other, allowing therefore for a multi-pass of the laser beam intensity into the films.

67. The method as claimed in claim 65, wherein the surface of the jaws are profiled to allow for three back and forth reflections from one jaw to the other, allowing therefore for four passes of the laser beam intensity into the films.

68. The method as claimed in claim 54, wherein said exposing comprises:

focusing on said section of said section of said package the laser beam intensity into a small spot;

scanning the small spot along the whole width of said section of said package to obtain an elongated seal; and

controlling the scanning speed to obtain a high quality seal.

69. The method as claimed in claim 68, wherein said scanning is continuous in time.

70. The method as claimed in claim 68, wherein said scanning is performed by using an optical set-up that comprises at least one mirror to scan the laser beam spot on the films.

71. The method as claimed in claim 54, wherein said exposing said section of said package comprises shaping the laser beam into a line wherein said line is wide enough to cover the whole width of the section of the package to be sealed.

72. The method as claimed in claim 54, wherein the desired intensity profile is a Gaussian profile.

73. The method as claimed in claim 54, wherein said beam intensity being shaped is performed by using a lenses and optical filters assembly.

74. The method as claimed in claim 54, wherein said desired intensity profile comprises an intensity profile having a dimension at least larger than the width of said package for the purpose of covering the whole width of the package to be sealed and cut.

75. The method as claimed in claim 58 further comprising monitoring said sealing or sealing-and-cutting operation by inspecting, using an optical detection assembly, said section of said package through the optical window of the optical sealing clamp, while the sealing or sealing-and-cutting operation is being performed.

76. A laser welding system for sealing or cutting polymeric sheets, the system comprising:

a laser source delivering a laser beam;

means to project the laser beam onto a region of said polymeric sheets where said sealing or cutting will be performed;

an optical device to image the sealing or cutting as it is performed;

an image analyser for asserting said sealing or cutting quality;

an integrated control means to control said laser source, said means to project, said optical device and said image analyser.

77. The system as claimed in claim 76, wherein said optical device comprises a camera.

78. The system as claimed in claim 76, wherein said optical device shares with said laser beam some elements.

79. A clamp to superpose and hold together at least two polymeric sheets while they are optically sealed or cut by a at least a laser beam, the clamp comprising:

two jaws wherein at least one of said jaws can be moved to allow a closing and an opening of the clamp,

one of said jaws, being a contact jaw, to bring the sheets into contact,

the other jaw, being an optical jaw, having an optical window to let said at least one laser beam pass through it and wherein said window is wide enough to allow to optically seal or cut the whole width of said sheets if required, and

support means to interconnect said jaws and to allow a controlled opening and closing of the clamp.

80. A method of sealing or cutting optically with at least one laser beam polymeric sheets, the method comprising:

superposing and bringing into contact at least two of said sheets together,

exposing an area of the sheets, the area corresponding to a sealing volume, to the at least one laser beam, providing an incident laser intensity, for the purpose of sealing or cutting said sheets,

increasing an intensity of the laser beam in the sealing volume by re-injecting partly or totally an unabsorbed portion of the incident laser beam intensity that has not been absorbed by the sheets back to the sheets by using at least one reflective device, therefore improving the efficiency of the sealing or cutting method by having more light intensity of said incident laser intensity absorbed by the sheets.

81. A method of optically sealing and cutting polymeric sheets with at least one laser beam having a shaped intensity profile, the method comprising:

shaping the at least one laser beam intensity profile by using an optical device to provide the desired intensity profile,

superposing and bringing into contact at least two of said sheets together, and

exposing an area of the sheets using appropriate optical elements, the area being referred to as a seal-cut-seal volume, to said desired intensity profile for the purpose of obtaining in one exposure step two sealed regions where the sheets are sealed together separated by a cut region where the sheets have been cut and wherein by the time the cut region is performed, the sealed regions are sealed.

82. A method of sealing or sealing-and-cutting packages made with polymeric sheets using at least one laser source and at least one optical sealing clamp, the method comprising the steps of:

i) providing a partially or completely formed package that is partially or completely filled with its content or being filled with its content,

ii) superposing and bringing into contact an inner wall of a section of said package for subsequent sealing by means of an optical sealing clamp,

iii) exposing said section of said package to at least one laser beam intensity, for a time exposure interval τ, to heat in a controlled manner said section of said package, said intensity being shaped to obtain a desired intensity profile and to provide a corresponding absorbed intensity profile in said section of said package,

iv) providing a desired heat amount to said section of said package in order to perform either a sealing operation or a sealing-and-cutting operation, by optimizing a

combination of said absorbed intensity profile, said time exposure interval, and by heating if required said optical sealing clamp,

v) obtaining as a result in the case of the sealing operation, a seal across said section of said package, and in the case of the sealing-and-cutting operation, two seals across said section of said package and simultaneously a cut region between the two seals where the package is cut.